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New and rare Australasian mosses, mostly from Mitten's herbarium

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(WITH PLATE 9)

The rich material in Mitten's herbarium contains a large number of undescribed species, many of which are valid for publication. I propose in this paper to describe some of these from the Australasian region, together with some from the same region which have come to me from other sources, a few notes on other rare species being added. I hope later to describe further species from other geographical regions.

I have to thank Mrs. N. L. Britton and the authorities of the New York Botanical Garden for both the material on which most of these species are based and for further specimens needed to elucidate them; and also to the authorities at the Kew Herbarium for facilities for studying the material there.

Dicranoloma angustiflorum Mitt., sp. nov.

PLATE 9, FIGURE 1

Sat robustum, ad 4 cm. altum vel ultra. Habitu foliisque *D. grossialari* C. Müll. simile, sed folia paullo breviora (1–1.4 cm. longa), in subulam *minus attenuatam argutius densius serratam* angustata; costa *tenuior*, basin versus *sæpe pertenuis indistincta*, 40–50 μ lata, superne robustior, in subula bene definita, dorso *profunde canaliculato-prominens*, *dense spinuloso-denticulata; vix excurrens*. Cellulae subulae omnes elongatae, *latiusculae*, parietibus curvatis, incrassatis, porosis.

Perichaetium *praelongum*, ad 1.5 cm. altum, *totam setam obtegens*, *angustissime arcte convolutum tubulosum*, bractea interna

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mutica (?), proxima brevi-aristata, ceteris multo brevioribus, *brevissime* cuspidatis. Seta perichaetium vix superans, theca (unica visa) breviuscula, curvata, oblongo-cylindrica, collo abrupto haud strumoso.

HABITAT: "In dense forests, Gordon River, Tasmania, *Dr. Milligan*, 11.46." Herb. Mitten.

This is no doubt nearest to *D. grossialare* C. Müll., but the leaves present some marked differences in the narrower, thinner nerve (thin at base but not narrow as in the *Billardieri*-group), which is not excurrent, vanishing in the somewhat wide apex, instead of being prolonged into a finely filiform arista; the upper cells also of a somewhat different nature (the figure may be compared with my figures of *D. grossialare* in N. Z. Inst., Bull. 3: *pl. 1. f. 4*). The perichaetium, strikingly developed there, is still more remarkable in the present case; it fits the seta "like a glove," and it is difficult at first sight to persuade oneself that it is not actually the seta itself; the very short, almost invisible points to the median bracts help to bear out the illusion, and at the same time constitute a difference from *D. grossialare*, where they are longer and more conspicuous.

Dicranum (?§ HOLODONTIUM) **aucklandicum** Dixon, sp. nov.

PLATE 9, FIGURE 2

Gracile, laxe caespitosum, nigricans. Caulis circa 1 cm. altus, parce ramosus, flexuosus, haud radiculosus. Folia *remotiuscula*, *alcata*, *siccitate vix mutata*, apice solum leniter flexuosa, 4–5 mm. longa, e basi brevi-lanceolata sensim in subulam pertenuem *integerrimam acutissimam* attenuata. Costa sat valida, superne *aegre discriminanda*, totam fere subulam occupans. Cellulae alares numerosae, magnae, rubrae, auriculas pro more magnas instruentes; rete reliquum *angustissimum*, *per totum folium elongatum*, *peranguste lineare*.

Autoica? Flos masc. sat magnum, longe infra caulis apicem situs. Bracteae perichaetii e basi lata vaginante in subulam tenuem cito angustatae. Seta *vix 1 cm. longa*, tenuis, substricta. Theca minuta, deoperculata circa 2 mm. longa, elliptica, suberecta, leviter curvata subsymmetrica. Operculum haud visum. Peristomium omnino fere peritum.

HABITAT: "Auckland Island, New Zealand," in herb. Mitten. No further particulars are given. The specimen was marked

"*Dicranum Billardieri*," but this could hardly have reference to the present plant, which has no resemblance or affinity to that species. It was under the same cover with *Dicranum pumilum* Mitt., from Hermite Island, showing that Mitten had recognized its affinities.

The capsules are too old for the peristome to be properly examined, and I am in some doubt as to the proper place of the species. It appears in some respects to be intermediate between the sections *Arctoa* and *Holodontium*. The inflorescence is not certainly autoicous. The only ♂ flower I have seen was on a stem which certainly showed no immediate signs of producing a perichaetium, though the ♂ flower itself was fully developed; it appeared to be lateral, but might very well have been originally terminal with the stem prolonged by innovation.

It appears to be most nearly allied to the Hermite Island *D. pumilum*, which is also a New Zealand species. That, however, is a plant of denser growth, with closer, shorter foliation, and a quite different leaf acumen, which instead of being gradually and finely subulate is (while very narrow) flattened and remaining of some appreciable width to the very point, and as it often has an inconspicuous twist just below the apex, bringing that part of the subula into (narrower) profile, it frequently gives the impression of the tip being actually widened. The upper cells in *D. pumilum* are comparatively wide and short, so that the nerve is easily distinguished from the rest of the lamina, instead of being almost indistinguishable as here. The sporophyte is very similar in both species.

I know of nothing else like it among the antarctic species. *D. ramulosum* Mitt. differs in the shorter seta ("2-linearis") and—*e descr.*—markedly in the branching.

Didymodon calycinus Dixon, sp. nov.

PLATE 9, FIGURE 3

Terrestris; caules inter muscos et hepaticas aggregati, circa 1 cm. alti, simplices vel infra flores parce ramosi. Folia juniora pallide viridia, senectute fuscescentia, sat conferta, omnia subaequalia, erecto-patentia, sicca subcontorta, brevia, 2 mm. longa vel paullo ultra, e basi latiuscula breviter lineari-lanceolata vel

lingulato-lanceolata, *substricta;* caulina plura acutiuscula, *saepius aeque ac ramulina rotundato-obtusa*, perconcava, carinata, marginibus ad apicem fere *late recurvis* integerrimis. Costa *valida* (ad basin 120 μ lata) ad apicem vel infra soluta. Cellulae basilares *longiuscule rectangulares*, pellucidae, *parietibus firmis*, superne quadratae, vel quadrato-rotundae, 8–10 μ latae, subpellucidae, haud incrassatae, laeves. Perichaetium *bene exsertum*, bracteis internis *erectis, e basi convoluta margine superiore eroso-denticulato, in mucronem brevem strictum latiusculum abrupte angustatis*, e cellulis saepius elongatis laxioribus instructis.

Seta 1 cm. alta vel paullo ultra, rubra; theca elliptica vel breviter cylindrica, circa 2 mm. longa, aetate castanea, subpachydermata. Cellulae exothecii omnes, juxta fere ad orificium ipsum, elongatae, parietibus incrassatis, flexuosis. Peristomium parvum, *intense rubrum*, e dentibus 16 compositum inferne inter se adhaerentibus (faciliter tamen solutis), *coronam rubro-purpuream densissime lamellatam circa 60 μ altam* instruentibus, superne in crura bina ter longiora erecta *filiformia* remote articulata *densissime papillosa* divisis. Spori minuti. Operculum haud visum. Dioicum videtur.

HABITAT: in a boggy place in grass paddock, among rushes, Mt. Bruce, Wairarapa, New Zealand, September 18, 1913, *W. Gray 176*.

This appears to me to be a very well marked species, in the obtuse leaves with widely reflexed margins, and the exserted convolute perichaetial bracts. The nearest species is perhaps *Trichostomum Cockaynii* R. Br. *ter.*, which resembles it somewhat in the leaves, but has quite different perichaetium and exothecium structure.

The short erect divisions of the peristome seem to refer this plant best to *Didymodon*, in spite of the exserted perichaetium; but the filiform, highly papillose crura are rather more like those of *Barbula*, and it might perhaps not improperly be placed in the section *Streblotrichum* of that genus. It is in any case very different from the New Zealand species (*B. calycina*) of that group.

Cinclidotus australis Dixon, sp. nov.

PLATE 9, FIGURE 4

Stirps elongata, robusta, submersa, *mollis*, habitu *C. fontinaloides*, superne olivacea, inferne nigricans; caulis distanter ramosus, ad 8 cm. longus, infra foliorum vetustorum costis

vestitus. Folia conferta, flexuosa, erecto-patentia, *haud falcata*, faciliter emollita, sicca valde contorta, 4–5 mm. longa, basin versus 1 mm. lata, carinato-concava, *e basi oblonga breviter late lanceolata, sensim ad apicem latum obtusum* angustata, marginibus infra angustissime reflexis, supra planis; integerrimis, *toto margine incrassato nec bistratoso;* costa valida, prope basin ad 150 μ lata, supra sensim angustata, *ad apicem vel paullo infra soluta;* sectione duces plures (6 vel ultra) in seriebus duabus, fasciculos stereidearum duos, cellulas externas parvas incrassatas exhibens. Rete perdensum, e cellulis *minutis* (5–8 μ) irregularibus, plerumque angulatis, subincrassatis, opacis, inferne sensim majoribus elongatis rectangularibus, infimis longe lineari-rectangularibus pellucidis laxiusculis instructum; marginalibus basin versus seriebus circa sex latioribus, sat laxe rectangularibus, *limbum pellucidiorem, circa quartam partem folii longitudinem attingentem,* formantibus, *serie unica marginali e cellulis multo brevioribus subquadratis* composita.

Fructus ignotus.

HABITAT: at bottom of creeks, Kaitangata, Otago, New Zealand, September, 1892, *D. Petrie.*

A very interesting species of a genus hitherto unknown in the southern hemisphere. The gradually tapering but obtuse leaves with the nerve ceasing below the apex are unlike any, I believe, of the northern species, while the mode of thickening of the leaf margin is also, I believe, unique in the genus, and unusual in the whole range of mosses, being effected not by an increase in the number of cell-layers, but in the vertical diameter of the cells, resulting in a thickening of varying degree, greater towards the base of the leaf, but causing at times an increase of at least three times the normal thickness of the lamina.

It is much to be hoped that this plant should be re-found—it should not be difficult—and further studied.

MACROMITRIUM EROSULUM MITT. AND ALLIED SPECIES

These New Zealand species form a somewhat difficult group, and several species have been described on what appear to be unsatisfactory grounds. Mitten compares his *M. erosulum* with *M. prorepens* (Hook.) Schwaegr., separating it by the direction of the leaves when dry, their narrower bases, upper portion longer, more obtuse, cells larger and less obscure (the suspected difference in inflo- es cen ce is in no way supported, I believe, by later observations). I

have compared Mitten's specimens with Hooker's type of *M. prorepens* (Dusky Bay, New Zealand, *A. Menzies 70*), and I have no doubt that some of these differences are illusory. Mitten, I think, and others who have studied Menzies' plant do not make allowance for the fact that it is as a whole a somewhat starved form; consequently the leaves are as a rule very short and in proportion wide—more oblong and less ligulate—and as a natural consequence very little crisped or twisted when dry. This latter feature has led to *M. prorepens* being contrasted by authors with other plants showing a more highly flexuose, more spirally twisted condition in the dry state. The position of the leaves when dry is in *Macromitrium* no doubt a highly important character; but it may be overstrained. The leaves in *M. prorepens* and this group of species are normally somewhat spirally twisted when dry, and always then more or less strongly circinate-incurved at the apex; where the branches are short and densely foliate the twisting is more marked and the leaves less crisped; where the branches are more elongate and the leaves somewhat less crowded they are less spirally contorted and the apical incurvation is more noticeable and more pronounced; these two forms may often be observed more or less distinctly on the same plant. On the type specimen of *M. prorepens* the leaves are on most of the branches so short that in the dry state they are scarcely more than appressed to the stem; they could not curl if they tried; and to make this a specific character is very much to deny the family resemblance of a convict to other members of his family on the ground that their hair curled while his did not! That this close, short, non-twisting foliation is not the normal character of *M. prorepens* is proved by the fact that here and there a better developed branch shows the leaves longer, more ligulate, incurved at the apices when dry and slightly twisted. In the Handbook of The New Zealand Flora it is suggested that the cells are "papillose" in *M. erosulum*, "scarcely papillose" in *M. prorepens*, but this is in no way borne out by the specimens; it is in fact the papillae on the surface of the cells in *M. prorepens* that for the most part produce the obscurity which is a character of the species.

Several indeed of the specimens at Kew of *M. erosulum* Mitt., determined by Mitten himself, are quite identical with *M.*

prorepens (Hook.) Schwaegr. The same is the case with *M. submucronifolium* Hampe & C. Müll. I have examined the type of this in Hampe's herbarium, and find no difference of any kind. The authors compare it with *M. mucronifolium* (Hook. & Grev.) Schwaegr., from Central and South America, and it is no doubt nearly allied to that; but it would have been more to the point if the authors had compared it with *M. prorepens*, which must have been known to them. They do not, however, refer to it, and neither in the description nor in the specimens of *M. submucronifolium* do I find any character in the slightest degree at variance with that species.

It may be pointed out that there is nothing in the specimen of *M. prorepens* to justify or explain the phrase in C. Müller's description (Syn. 1: 725) of the basal cells as "minute quadratis" they are narrowly linear as in all the allied species, and the phrase is probably due to an error of writing or of typography.

I have not been able to see a specimen of *M. oocarpum* C. Müll., but judging from the description I should feel moderately certain that it is only *M. prorepens*. The very short seta is the only character suggesting a difference, and I shall refer to this character as well as to the areolation in the group later on.

It is necessary in order to explain the true relationships to make some remarks on the character of the areolation. Brotherus (Musci, Engler & Prantl, Nat. Pflanzenfam. 1^3: 484. 1903) divides the species containing the group now being dealt with into two series, thus:

Ka. Zellen der Lamina klein, etwa 0.025 mm. mit niedrigen Papillen.

Kb. Zellen der Lamina 0.05–0.07 mm., durchsichtig mit hohen, zuweilen stacheligen Papillen.

The broad distinction is a clear and well established one, but I cannot follow him in the actual measurements. I have seen no species—certainly there are none among the plants already mentioned—in which the cells approach the minuteness of 2.5 μ. Careful measurements of a good many leaves of *M. prorepens* give a fairly constant size to the upper cells, ranging from 7 to 11 μ; while in the larger-celled species they are similarly constant, ranging from 9 to 14 μ. In neither case therefore do the measure-

ments agree with those given by Brotherus. Moreover the cells of *M. ligulifolium* Broth. are there cited as in the former category (2.5 μ), while the original description gives them as 12–15 μ. I suppose therefore some error in the "Musci." The distinction in the character of the areolation is however a very real and marked one, and well described by Brotherus; but it depends less on the size of the cells than on the character of the papillæ. The cells in fact in the first named group though smaller are not greatly smaller than in the latter. In these they are large, arranged in regular longitudinal series, and pellucid; each crowned with or rather rising into a large prominent conical papilla or tubercle, which may be minutely bifurcate above, but inconspicuously. In the other group the cells while a little smaller are of the same form and arrangement, but this is masked by the papillae with which they are covered,—lower, dense, numerous, and much branched, so as greatly to obscure both the cells and their walls, rendering their size and outline very ill-defined (cf. PLATE 9, FIGS. 5, 6).

This character once appreciated will easily separate *M. erosulum* from *M. prorepens*, and will show into which category doubtful plants passing under the name of *M. erosulum* must go. That all the New Zealand species of this group with hairy calyptra belong to one or other of these two species I am not prepared to say. In any case the "*M. microstomum*" of the Flora of New Zealand is, I think, generally agreed to belong here and not to the true Oceanic species; I have practically no doubt that *M. papillifolium* C. Müll. is identical with *M. erosulum*. *M. grossirete* C. Müll. and *M. rigescens* Broth. & Dixon have the capsules gymnostomous, and perhaps rather narrower, and these may be characters of sufficient value—if stable—to allow them distinctive rank.

Mitten named certain plants in his herbarium and at Kew *M. abbreviatum*, from the short seta. In his original specimens it varies from 2 to 3 cm. Within certain limits this is no doubt a good character. But in the allied species *M. prorepens* it varies very markedly; on the same stem setae of 2 cm. and even less occur with others reaching 4 cm. And in specimens from Lord Howe Island, *McGillivray*, which Mitten has named (on the strength of this character) *M. abbreviatum*, but which indubitably belong rather to *M. prorepens*, the seta is absurdly—perhaps pathologically—

short, so that the capsule is scarcely emergent. Too much stress must therefore not be placed on the exact length of the seta; and for this reason I consider inseparable from *M. erosulum* the plant of T. W. Naylor Beckett's to which Brotherus has given the manuscript name of *M. perpapillosum*. I can find no difference between this and Mitten's *M. erosulum* in the leaves or fruit, only the seta is longer than usual, ranging from 2 to 4 cm. on one tuft, and from 2.5 to 5 cm. on another.

Macromitrium (EU-MACROMITRIUM, GONIOSTOMA) **Petriei** Dixon, sp. nov.

PLATE 9, FIGURE 7

Sat robustum; caulis elongatus, ramis erectis, *graciliusculis*, substrictis, *elongatis* (ad 2 cm.), simplicibus vel hic illic divisis; folia *pro more laxiuscula*, *suberecta substricta*, *siccitate arcte erecto-appressa*, *apice tantum circinato-incurva*, 2–2.5 mm. longa, e basi elongata elliptica lanceolata, sensim acutata, apice *plerumque acuta*, *saepius mucronata*, marginibus planis vel irregulariter reflexis, argute eroso-papillosis. Cellulae pellucidae, haud incrassatae, 8–14 μ latae, *eis M. erosuli similes*. Perichaetialia parva, subsimilia. Seta 1 cm. vel paullo ultra, theca elliptica brevicolla, 2 mm. longa, operculo subulirostro aequilongo. Calyptra longipilosa. Spori valde inaequales, interdum ad 50 μ lati, papillosi. Dentes peristomii breviusculi, fusci, densissime papillosi, opaci.

HABITAT: Clinton Valley, Te Anau, New Zealand, *D. Petrie*.

Although in leaf-structure this is scarcely separable from *M. erosulum* (the leaves however are longer and more acute than is usually at least the case there), the long straight branches, rather slender on account of the less dense foliation, and the leaves suberect, not spreading when moist and closely appressed except at the points when dry seem to entitle it to specific rank. Both *M. prorepens* and *M. erosulum* vary very considerably in size and habit and length of branches, but I have seen nothing among them which seems to approach the present plant, and I think it must deserve specific rank. It bears a much closer resemblance to *M. rigescens* Broth. & Dixon, a gymnostomous species; in fact it occupies almost exactly the same relationship to *M. erosulum* as *M. rigescens* does to *M. grossirete*; Mr. Petrie's plant only

showing a few other minor differences from *M. rigescens*, e. g., the branches more slender and rigid, the leaves a little longer and narrower, the operculum with a longer subula.

Pohlia (EUPOHLIA) **novae-seelandiae** Dixon, sp. nov.

PLATE 9, FIGURE 8

Dense caespitosa, pallide viridis subnitida, caules vix 1 cm. alti, simplices, foliis inferioribus perpaucis, minutis; superioribus dense comatis multo longioribus, ad 2 mm. longis, peranguste lanceolatis, valde acutis, subdecurrentibus, *parum concavis*, *marginibus omnino planis*, supra medium folium magis magisque acute denticulatis; costa basi valida, supra sensim angustata, percurrens vel saepius in mucronem peracutum integrum vel subdenticulatum excurrens. Cellulae *angustissime lineares parietibus firmis nec incrassatis*, basin versus sensim latiores, anguste rectangulares, ad alas perpaucae latiores, late rectangulares.

Dioica. Flos masc. *gemmiformis*, terminalis. Folia perichaetialia interna angustiora, breviora. Seta 1.5–2 cm. alta, gracilis, theca *inclinata*, subcylindrica vel angustissime piriformis, cum collo angusto subaequilongo 3–4 mm. longa, operculo *alte peracute conico*. Annulus *latus*, persistens. Exothecii cellulae *elongatae*, *angulis rotundatis*, *parietibus leniter curvatis*, subincrassatis. Peristomium bene evolutum, flavescens, dentes anguste lanceolati, infra confertiuscule lamellati dense minutissime papillosi, supra densiuscule articulati, *grossius papillosi*. Endostomii processus e membrana *tertiam partem tantum longitudinis aequante* late lanceolati, *dentibus subaequilongi*, pallidi, *minute papillosi*, *late rimosi*. Cilia *rudimentaria*.

HABITAT: Evans Flat, Tuapeka County, Otago, New Zealand, October, 1891, *D. Petrie*.

A species of somewhat doubtful position in the genus; the leaf-structure, the rudimentary cilia, and perhaps the exothecium tissue, would place it in *Eupohlia*, while on the other hand the high basal membrane and well-developed processes of the inner peristome seem to refer it to Lamprophyllum. In any case it is nearly related to *P. leptocarpa* (v. d. B. & Lac.) Fleisch., and as this is usually ranked under *Eupohlia* I place the present species there. The plane-margined leaves, the inflorescence and peristome, both inner and outer papillose, distinguish it from the above-named and other species. Among the New Zealand species there are none very closely allied, *P. nutans* being perhaps superficially

most like it. The capsule resembles that of the smaller forms of *P. elongata*.

Anomobryum densum Dixon, sp. nov.

PLATE 9, FIGURE 9

Dense caespitosum, terrestre; caules infra arcte compacti, terra intertexti, haud radiculosi, vix 1 cm. alti, simplices vel sub floribus innovantes, *stricti*, *rigidi*, *fuscescentes*, sicci madidique *arcte julacei*, apice angustati, subobtusi. Folia *arctissime imbricata*, *perconferta*, *minuta* (.5 mm. longa) *cochleariformia*, brevissime ovata vel omnino orbicularia, *obtusissima*, marginibus erectis integris vel subintegris; costa sat valida, fusco-aurantiaca, ad basin dilatata rubra, *paullo infra apicem evanida;* sectione prope basin duces circa quinque dorsales, cellulas ventrales duas magnas subinflatas, rete internum substereideum exhibens. Rete folii *densum*, e cellulis superne parvis (12–20 μ × 8–14 μ), *breviter* irregulariter *late rhomboideis*, inde sensim majoribus, inferioribus late rectangularibus, *infimis pulchre rubris*, omnibus angulis rotundatis, pellucidis, auratis, *incrassatis*.

Folia caulis fructiferi comalia angustiora, longiora, *obtusa*, areolatione elongata; perichaetialia intima parva, *lanceolata*, *subobtusa*, *denticulata*, tenuicostata, cellulis multo angustioribus supra linearibus. Paraphyses permultae, filiformes, longae, e perichaetio plus minusve excedentes. Vaginula brevis. Seta 1–1.25 cm. alta, rubra, superne pallidior, apice arcuata, inde fructus subpendulus vel horizontalis. Theca e collo anguste defluente breviter ovato-pyriformis, castanea, operculo convexo vel obtuse conico; exothecii cellulae sat regulariter rectangulares, parietibus firmis, orificium versus sensim minores. Annulus? Peristomium aurantiacum, dentibus lanceolatis, .3 mm. longis, dense lamellatis, minutissime obscure papillosis, superne pallidis laevibus; endostomii processus e membrana basilari *circa tertiam partem longitudinis dentium vel paullo ultra* aequante angusti, *lineari-lanceolati*, dentibus aequilongi, pallidi, vix papillosi, *angustissime rimosi; cilia nulla vel omnino rudimentaria*. Spori 20–24 μ, fulvi.

HABITAT: South Island, New Zealand, 1888, *R. Helms*. Ex herb. J. Cosmo Melvill sub nomine "*Bryum blandum* det. Boswell" acceptum.

This very distinct species I have only in small quantity; it was probably gathered in the Paparoa Range,* as were nearly all Helms' plants sent to Mr. Melvill with this one; it is much to be

*Since the above was in print I have received a further specimen labelled "Paparoa Range, 1885."

desired that it should be refound. It has nothing in common with *Bryum blandum* except the obtuse apex of the concave leaves. It is very distinct in the densely crowded tightly imbricated small rounded leaves, the character of the areolation, and the imperfect peristome.

Philonotis australis surculigera Dixon, var. nov.

Caules *stricti*, condensati, basi *haud tomentosi*, 4–5 cm. alti, simplices, foliis patentibus haud falcatis; *per totam longitudinem inter folia surculis gemmiformibus minutis foliosis dense confertis omnino obtecti.*

HABITAT: Otago, New Zealand, *D. Petrie.*

This plant was received from Mr. Petrie with a note in the hand of W. Bell indicating that he considered it a *Bryum*, "probably new, and may stand near *Wahlenbergii.*" In spite of its resemblance to this species, however, it is a *Philonotis*, of a very striking appearance, but the structure of the leaves shows it to be too near to *P. australis* (Mitt.) Jaeg. to be specifically separated. The stems are densely clothed, so as to be almost hidden, nearly from the very base, with innumerable brood-bodies, in the form of minute ramuli, of the nature of dwarf plantlets, each composed of a short stem with numerous ovate-lanceolate sharply denticulate nerveless leaves.

Somewhat similar forms occur in several of the European species of *Philonotis*, but in those I have seen the branchlets are usually almost normally formed, but small, numerous and very caducous; here they are much specialized and more distinctly of the nature of "brood-bodies." In size they bear about the same proportion to the leaves as do the gemmae of *Pohlia proligera* Lindb. to its leaves.

Thamnium baculiferum Dixon, sp. nov.

PLATE 9, FIGURE 10

Robustum, caulis secundarius rigidus, 7 cm. longus vel ultra, curvatus, supra *sub-pinnate ramosus*, *frondem percomplanatam* instruens; inferne simplex vel hic illic *surculum tenuem perfecte strictum*, *teretem baculiformem* gerens. Rami inaequales, complanato-compressi, hic illic divisi, ad 3 cm. longi, 4–5 mm. lati, virides, *nitentes*. Folia *complanata*, paullo decurva, subconcava,

lateralia uno margine late, superiora et inferiora marginibus ambobus angustius inflexis, *magna*, 3 mm. longa, medio folio 1 mm. lata, late oblonga, basi paullo dilatato ad insertionem angustiore, supra *late rotundata apiculata, apicem versus grosse inaequaliter dentata;* madida leniter striata, sicca *pluries profunde plicata.* Costa infra valida, supra medium cito attenuata, *longe infra apicem soluta, opaca,* dorso *laevis.* Rete *perdensum,* cellulis medianis anguste lineari-rhomboidis, omnibus parietibus tenuibus, eae apicem versus breviores, latiusculae, regulariter rhomboideae, circa duplo longiores quam latae; infra minime mutatae, paullo tamen elongatae, *angustissimae,* ad angulos extremos tantum paucae paullo latiores, bistratosae, obscurae, *maculam minimam alarem inconspicuam opacam* formantes; omnes densissime chlorophyllosae, *laeves.* Folia stipitis squamiformia, infima aeque ac illa surculorum baculiformium acuminata squarroso-reflexa, membranacea.

Cetera ignota.

HABITAT: Waikopiro, Hawkes Bay, New Zealand, *S. Chadwick,* comm. G. Webster.

Brotherus writes that this—unless it should be *Th. neckeroides* (Hook.) B. S. G.—is certainly a new species. I have examined the type of *Hypnum neckeroides* in the Hooker herbarium at Kew; it has non-complanate leaves, the nerve sharply toothed at back, and reaching nearly to the narrowed though subobtuse apex; while the upper cells are small and rounded. It is a quite different plant from the present. Moreover it appears that Menzies' plant was erroneously stated to come from "Dusky Bay, N. Z." It was really one of his North American gatherings, and the species is, so far as is known, confined to the west coast of Nortn America. In any case it has no near relationship to our species, which is very closely allied to *Th. arbusculans* (C. Müll.) Jaeg. from Chile and western Patagonia; in fact Dusén's specimens of that plant only differ in the less plicate leaves, the thinner nerve, and more pellucid non-chlorophyllose areolation—the latter character possibly depending partly at least on the greater age of the specimens. Dusén's specimens, however, show none of the rather striking rod-like shoots from which the present plant is named. These are peculiar; those on the few stems I have seen are perfectly straight, up to an inch in length, and terete except for the minute squamiform leaves.

Judging from Dusén's specimens of *Th. arbusculans* Mr. Chadwick's gatherings represent a young, not fully grown form of the plant.

Thamnium latifolium elongatum Dixon, var. nov.

Caulis primarius filiformis, secundarius *pendulus flexuosus mollis, semipedalis et ultra*, subpinnatim, *distanter brevi-ramulosus*, ramis 1–2 cm. longis. Cetera ut typ.

HABITAT: Mt. Bruce, Wairarapa, New Zealand, June 19, 1913, *W. Gray 200.* "Probably growing pendent from a tree with *Meteorium*" [i. e. *Papillaria*], W. Gray *in litt.*

There has been some little doubt as to the identity of the New Zealand species with *Porotrichum latifolium* V. d. B. & Lac. of Java; partly on grounds of geographical distribution, partly, perhaps, on the ground that the New Zealand plant is as a rule more densely and repeatedly branched and less flexuose than the Javan (the New Zealand plant was first described by Lindberg as *Th. australe*, but was afterwards referred by Kindberg to *Th. latifolium* [V. d. B. & Lac.]. Kindb.). If this is the case the plant under consideration should remove all hesitation on that score, for it comes much nearer in habit to the Javan form, though far longer (some stems reaching to 8 inches in length); and in fact if the plant figured (Bry. jav. *pl. 188, f. 2*) were three times the length, it would give a very fair representation of the present remarkable form.*

Pterygophyllum distichophylloides Broth. & Dixon, sp. nov.

PLATE 9, FIGURE 11

E. minoribus generis, habitu omnino fere *Distichophyllorum* majorum, siccitate tamen foliis valde crispato-contractis caulem saepe haud obtegentibus. Color viridis, vetustate aliquando rubescens. Caulis, ut paret, prostatus, inferne radiculosus, 2–3 cm. longus, parce ramosus, valde complanatus; folia madida pulchre imbricata, dorsalia 4-seriata, arcte appressa, lateralia patentia, complanata, ventralia 2-seriata appressa; sicca *valde crispata contractaque, inde caule pallido detecto conspicuo.* Folia dorsalia circa 2 mm. longa, *latissime cordato-ovata* (*ea series medi-*

* Since writing the above I have received a further specimen from Mitten's herbarium, as "*Isothecium pandum* H. f. & W., New Zealand, *Kirk.*"

anae suborbicularia) *obtusa vel obtuse apiculata*, lateralia e basi angustiore *spathulato-oblonga*, 3 mm. longa, *acute apiculata*, omnia marginibus planis, *subintegris vel eroso-crenulatis*, perpellucida; costa supra tenuis, flexuosa, ad ¾ folii attingens, nec furcata, ad basin dilatata. Rete laxum, e cellulis hexagonis, supra (prope costae summitatem) 30–35 μ, latis, pellucidis, apicem et margines versus *paullo minoribus*, *1–2 seriebus marginalibus multo minoribus*, limbum aegre notatum formantibus; basin versus multo laxioribus, elongate hexagonis, hyalinis; parietibus omnibus tenuibus.

Cetera ignota.

HABITAT: near Auckland, New Zealand, 1892, *D. Petrie 800.*

This was submitted to Dr. Brotherus, who replied that it appeared to be a very distinct species from the rest of the genus. The habit and the subentire leaves mark it at once; while the species of *Distichophyllum* with unbordered leaves (*D. microcarpum* [Hedw.] Mitt., etc.) differ radically in the minute areolation of the marginal and juxta-marginal portion of the leaves. Here the cells towards the margin are only slightly reduced in size, except those of the actual marginal series, and these are of quite a different character from those of the *Distichophylla* mentioned.

TAXITHELIUM POLYSTICTUM (Mitt.) Jaeg.

Among some mosses sent me by Mr. W. Gray from Mt. Egmont, New Zealand, collected in January, 1912, I found a stem, with a single capsule, of a *Taxithelium*, which on comparing with the original of *Hypnum polystictum* Mitt. at Kew I found to be identical with that species; the only difference being that the stem leaves there usually want the longer, acuminate points shown in the Mt. Egmont plant, are in fact more like the branch leaves. The Kew specimen however is a mere scrap, and does not show the stem leaves to advantage (Mitten's description in the Handbook of the New Zealand Flora simply says, "leaves broadly ovate, shortly acuminate," making no distinction between stem and branch leaves). A stem from Mitten's herbarium shows several of the stem leaves with the abrupt acuminate points. As the fruit has not been recorded I append a short description:

Perichaetium sat magnum, 3.5 mm. altum, pallidum, cylindricum, bracteis numerosis, externis parvis, patentibus, breviter aristatis, dentatis, medianis suberectis, argute dentatis, longius

aristatis, internis pluribus convolutis, erectis, in acumen loriforme vel subaristatum dentatum attenuatis. Seta 1.5 cm. longa, omnino laevis. Theca *Plagiothecii*, inclinata, oblongo-cylindrica, curvata, brevicolla, 2 mm. longa; exothecii cellulae isodiametricae, subincrassatae, collenchymaticae. Peristomii dentes pallidi, infra dense alti lamellati, transverse striolati, linea media recta, supra conferta articulati, pellucidi, sublaeves; processus peranguste lanceolati, anguste rimosi, parce papillosi. Spori circa 16 μ. Cetera inquirenda.

The systematic position of this species—beyond its undoubted standing in the subgenus *Polystigma*—is not very clear. The branches are slightly compressed with the lateral leaves spreading, but only moderately so; the alar cells form a distinct group of abruptly enlarged, hyaline, somewhat vesicular cells, and the upper ones are very small and narrow, each with a row of well marked but minute papillae, the marginal row of cells being hyaline and smooth. The inflorescence is doubtful, probably dioicous.

Rhynchostegium cylindritheca Dixon, sp. nov.

PLATE 9, FIGURE 12

Robustum, late dense extensum; habitu et foliis *Rh. tenuifolii*, sed rete *perangustum*, cell. 3–5 μ latis (in *R. tenuifolii* 5–8 μ), inferne *minime laxius;* illo *R. tenuifolii minus pellucidum.* Folia per totam fere ambitum minute denticulatum; folia perichaetialia interna *omnino erecta, madida stricta, brevius acuminata.* Theca *anguste cylindrica*, elongata, suberecta, sicca (deoperculata matura) haud sub ore constricta; operculum *longe subulirostrum.* Fructus *aestate* maturans.

HABITAT: on wood, Mauriceville, Wairarapa, New Zealand, September 26, 1912, *W. Gray 145*; on branches of tree, Mt. Bruce, Wairarapa, 1912 and 1913, *W. Gray 128;* N. E. Valley, Dunedin, *D. Petrie.*

The Australasian species of *Rhynchostegium* are somewhat difficult of elucidation, *R. tenuifolium* (Hedw.) Jaeg. varying considerably in leaf form, areolation, and denticulation, and *R. elusum* (Mitt.) Jaeg. and *R. aristatum* (Hook. f. & Wils.) Jaeg. being much alike in general appearance, and the former seeming to lack very well defined characters. I believe the present however to be a good species, although in general appearance very closely

resembling *R. tenuifolium*, and no doubt easily mistaken for it. The perichaetial bracts in *R. tenuifolium* are however squarrosely spreading with longly acuminate points, while here they are shortly acuminate and the inner ones at least straight and erect. In this respect *R. aristatum* agrees, but that is a smaller, dark green, not glossy plant, having fine, almost piliferous leaf points, and shorter oblong capsule, with a much shorter beak to the lid.

The capsule in the present species is very distinct, but it must be premised that in all the species of the group the capsule if dried before maturity becomes, even if the lid falls off, more or less narrowly cylindrical, curved, and strongly contracted below the mouth, especially on the lower side. Well-ripened capsules, if possible operculate, are necessary to proper study. In *R. tenuifolium* and the two cited species these will be found to be more or less turgid, oblong-elliptical, and usually horizontal, becoming as a rule contracted below the mouth. In the newly described species they are narrowly cylindrical at all stages, very slightly curved and suberect, and except when dried before maturity are very little or not at all constricted below the mouth when dry.

The time of maturing fruit appears also to be different. In *R. tenuifolium* the capsules mature about May–June, and I have specimens from Mr. D. Petrie collected in August with many of the lids still *in situ*. In *R. cylindritheca* on the contrary specimens collected in September show the capsules quite immature, while others gathered in February have the fruits nearly all deoperculate.

It may be noted that there appears to be an error in Flora Tasmaniae, *pl. 176*, where the figures of the perichaetia in *H. aristatum* and *H. collatum* (= *R. tenuifolium*) seem to have been transposed. The bracts in *H. aristatum* are described by Mitten and Wilson as erect, while those of *H. collatum* are described by Wilson as "perich. longius acuminatis, recurvis"; but these characters are exactly reversed in the figures, and I take it there was an accidental transposition of the drawings of the two organs.

NORTHAMPTON, ENGLAND

Explanation of plate 9

FIG. 1. *Dicranoloma angustiflorum* Mitt. (type). *a*, leaf apex, ×20. *b*, cells, lower part of subula, ×200. *c*, perichaetium, ×2.

FIG. 2. *Dicranum aucklandicum* Dixon (type). *a*, leaf, ×10. *b*. upper cells, ×200.

FIG. 3. *Didymodon calycinus* Dixon (type). *a*, lower leaf, ×20. *b*, upper leaf, ×20. *c*, perichaetium, ×10. *d*, upper cells, ×200. *e*, basal cells, ×200.

FIG. 4. *Cinclidotus australis* Dixon (type). *a*, leaf, ×10. *b*, upper cells, ×200. *c*, basal cells, ×200. *d*, marginal cells a little above base, ×200. *e* transverse section of leaf margin near mid-leaf, ×100. *f*, transverse section of leaf margin near base, ×100.

FIG. 5. *Macromitrium prorepens* (Hook.) Schwaegr. (type). *a*, upper cells, × 200.

FIG. 6. *Macromitrium erosulum* Mitt. (Canterbury, *Sinclair & Haast*). *a*, upper cells, ×200.

FIG. 7. *Macromitrium Petriei* Dixon (type). *a*, part of stem, ×1 (left hand branch moist, the rest dry).

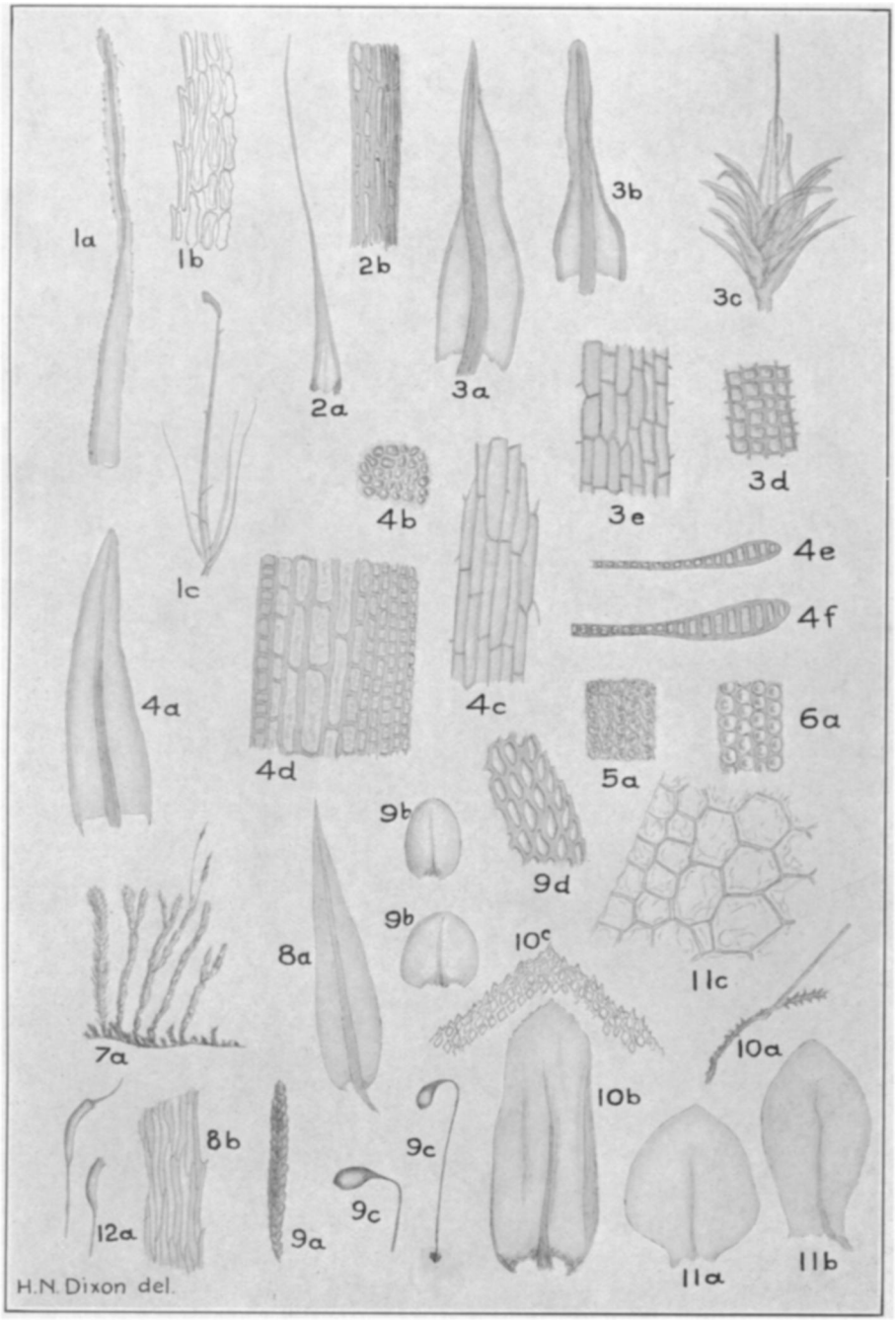
FIG. 8. *Pohlia novae-seelandiae* Dixon (type). *a*, leaf, ×20. *b*, upper cells, ×200.

FIG. 9. *Anomobryum densum* Dixon (type). *a*, sterile stem, ×10. *b*, leaf, ×20. *b'*, leaf, flattened out, ×20. *c*, *c'*, fruit, ×2. *d*, upper cells, ×200.

FIG. 10. *Thamnium baculiferum* Dixon (type). *a*, rod-like shoot, ×1. *b*, leaf, ×10. *c*, leaf apex, ×30 (not very accurate).

FIG. 11. *Pterygophyllum distichophylloides* Broth. & Dixon (type). *a*, dorsal, *b*, lateral leaf, ×10. *c*, upper cells, ×200.

FIG. 12. *Rhynchostegium cylindritheca* Dixon (type). *a*, capsules, ×4.



DIXON: AUSTRALASIAN MOSSES